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Patent Application

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**METHODS AND ARRANGEMENTS FOR PROVIDING
AND USING PRINTER CONFIGURATION
STATUS INFORMATION**

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**METHODS AND ARRANGEMENTS FOR PROVIDING
AND USING PRINTER CONFIGURATION
STATUS INFORMATION**

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RELATED APPLICATIONS

~~This Patent Application is related to Patent Application No. _____~~

~~(Attorney Docket No. 1-990650-1) filed concurrently herewith.~~

TECHNICAL FIELD

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The present invention relates to computers, and more particularly, to methods and arrangements for providing and using printer configuration status information to increase productivity of a printer coupled to one or more computers.

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BACKGROUND

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A typical office setting includes a plurality of networked computers that are configured to share resources over the network. For example, an office may include a local area network (LAN) that is configured to provide connectivity between several personal computers (PCs) and a laser printer. The laser printer is a shared resource. Each of the PCs can send a print job to the laser printer. Some networks may include the use of a print server to control access to the laser printer. The print server can interface with the PCs and the laser printer to provide enhanced printing services. For example, the print server may maintain a print queue that stores and/or forwards print jobs to the laser printer at a particular time or in a particular order.

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When a typical laser printer is connected to the network, an administrator or other user installs the requisite printer driver software on the

The method includes selectively configuring at least one print media supply tray based at least on a print media size and a print media type, and automatically displaying current configuration status information about the print media supply tray, including the print media size and the print media type, whenever the print media supply tray is operatively modified in a detectable way.

Here, the print media supply tray may be selectively configured by causing at least a print media size detectable mechanism to be modified in a manner that corresponds to the print media size, and causing at least a print media type detectable mechanism to be modified in a manner that corresponds to the print media type. The print media size and print media type detectable mechanisms may be provided through the print media tray, a printer input panel and/or a print driver graphical user interface.

Automatically displaying current configuration status information about the print media supply tray can further include detecting the print media size and print media type detectable mechanisms and providing a resulting current configuration status information to a print media tray-mounted display, a printer display panel and/or the print driver graphical user interface.

Automatically displaying current configuration status information may also include determining when the print media supply tray is operatively modified by detecting at least one physical change associated with the print media supply tray. Here, for example, the physical change may be detected using the print media size detectable mechanism, the print media type detectable mechanism, a tray position detectable mechanism, and/or a print media present or available detectable mechanism.

A system is also provided, in accordance with certain further aspects of the present invention. The system includes at least one computer, and a printer

Fig. 6 is a flow-chart depicting an exemplary process for using printer status configuration data during the installation of printer driver software on a plurality of computers.

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DETAILED DESCRIPTION

While the following detailed description refers to an exemplary
10 computer network and a shared resource printer, it should be understood that the various methods and arrangements in accordance with the present invention are applicable to all types of computers, networks, direct connections, dedicated printers, laser printers, ink-jet printers, copiers, scan-to-copy devices, and the like.

15 With this in mind, Fig. 1 depicts a computer network 20 having a plurality of computers 22 coupled to at least one communications network 24. Communication network 24 is further coupled to at least one printer 26. Computers 22 and printer 26 are configured to communicate with each other over communications network 24. By way of example, communications
20 network 24 can include a local area network (LAN), or the like. Communications network 24 may also include a print server node (not shown). Computers 22 may include hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like.

25 For this discussion it is assumed that computers 22 are PCs and that printer 26 is a laser printer. As such, print jobs, for example, as generated in an

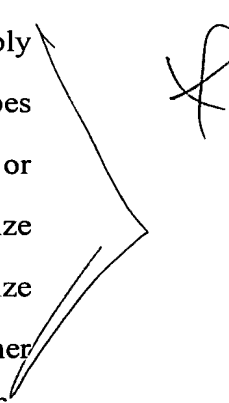
For example, a memory 34 is coupled to controller 30 via bus 32. Memory 34 can include any type of data storage. As depicted, memory 34 includes a primary memory 36 and a secondary memory 38. Primary memory 36 typically includes solid-state memory circuits such as, for example, a read only memory (ROM) and a random access memory (RAM). Primary memory 36 can include, for example, computer instructions associated with at least one program 40 designed to support the operation of controller 30. Primary memory 36 may also provide limited capacity for data buffering of a print job. In this example, secondary memory 38 represents a higher capacity data storage device, such as, for example, one or more flash memory circuits, a magnetic hard drive, a read/write optical disc drive, or the like. Preferably, secondary memory provides enough data storage to hold a plurality of variably sized print jobs.

A network interface 42 is also coupled to controller 30 and memory 34 via bus 32. Network interface 42 is configured to receive a print job 43 from computer 22 over communication network 24, for example. Network interface 42 can also output data through communication network 24 to computer 22. Print job 43 is passed through bus 32 to controller 30 and/or memory 34, as required. An exemplary print job 43 is further graphically illustrated in Fig. 3A, and described below in greater detail.

Referring again to Fig. 2, a user interface 44 is coupled to controller 30 via bus 32. User interface 44 is configured to provide information to a user and receive inputs from the user. Here, a display 46 (visual and/or audio) is depicted and configured to provide information about the operation of printer 26 to the user. Input keys 48 are also depicted and configured to allow the user to input information regarding printer operation and/or configuration to controller 30, for example.

A print unit 50 is depicted as being coupled to controller 30 via bus 32. Print unit 50 includes mechanisms that are arranged to selectively apply ink (e.g., liquid ink, toner, etc.) to a print media (e.g., paper, plastic, fabric, etc.) in accordance with print data within print job 43. Thus, for example, print unit 50
5 can include a conventional laser printing mechanism that selectively causes toner to be applied to an intermediate surface of a drum or belt. The intermediate surface can then be brought within close proximity of a print media in a manner that causes the toner to be transferred to the print media in a controlled fashion. The toner on the print media can then be more permanently
10 fixed to the print media, for example, by selectively applying thermal energy (heat) to the toner and pressure to the print media. Print unit 50 can also be configured to support duplex printing, for example, by selectively flipping or turning the print media as required to print on both sides. Those skilled in the art will recognize that there are many different types of print units available,
15 and that for the purposes of the present invention print unit 50 can include any of these various types.

A print media supply unit 52 is coupled to controller 30 via bus 32, for example. Print media supply unit 52 includes mechanisms that are designed to selectively provide the requisite print media for a given print job 43 to print
20 unit 50. In this example, print media supply unit 52 includes two supply trays 54a-b, and two supply bins 56a-b. Supply trays 54a-b are preferably configurable by the user to accept, store, and/or deliver various sizes and types of print media. Thus, for example, supply tray 54a may be manually or automatically configurable for letter size paper (8.5 x 11 inches), legal size
25 paper (8.5 x 14 inches), executive size paper (7.25 x 10.5 inches), A4 size paper (8.27 x 11.69 inches), B5 size paper (7.17 x 10.12 inches), and/or other similar standard/custom sizes. Supply tray 54a may also be configurable for





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15 and possibly the type of print media provided/available from supply trays 54a-b and supply bins 56a-b. Consequently, controller 30 can be configured to make decisions regarding a particular print job based on the availability of the requisite print media.

supply unit 58 is configured to provide toner (ink) to print unit 50. As depicted in Fig. 2, toner supply unit 58 includes supply of toner 60. Toner 60 can include one or more colors/types of toner (ink) that can be selectively provided to print unit 50 as needed. Toner supply unit 58 may also be configured to provide information about toner 60 (e.g., availability, levels, etc.) to controller 30. Thus, controller 30 can be configured to make decisions regarding a particular print job based on the availability of the requisite toner.

other examples, only configuration data 80 may be included. Configuration data 80 may include a printer ID 80a and additional information about the current configuration and/or status of printer 26. By way of example, configuration data 80 can include a print media supply tray identifier 80b associated with a particular supply tray/bin 54/56, print media size data 80c and print media type data 80d further identifying the print media configuration of the particular supply tray/bin 54/56, and print media availability data 80e identifying the availability of print media within the particular supply tray/bin 54/56.

Fig. 4 is a block diagram depicting an exemplary print media supply tray 54a within printer 26. As depicted, print media supply tray 54a is configurable to hold a plurality of sheets of print media 51.

Adjustable guides 55a-1 and 55a-2 are detectable mechanisms that are provided to define the width and length, respectively, of print media 51. For example, the user can mechanically move guides 55a-1 and 55a-2 during configuration/reconfiguration, and/or loading/unloading of the print media. The position or placement of guides 55a-1 and 55a-2 is detectable, for example, through mechanical and/or electrical sensors, by controller 30 or similar processing resources within print media supply unit 52. In this manner, controller 30, for example, is able to detect or otherwise determine print media size data 80c for print media supply tray 54a. Those skilled in the art will recognize that other types of input devices, such as, for example, dials, etc., may be also be used to allow the user to selectively define the dimensions of print media 51.

The exemplary print media tray 54a further includes a print media type detectable mechanism 55b. Print media type detectable mechanism 55b may include, for example, a dial or other input device that allows the user to

selectively define the type of print media within print media supply tray 54a. In certain implementations, print media type detectable mechanism 55b may include automatic sensors that are configured to detect the type of print media 51 within tray 54a. For example, one or more optical sensors may be employed to detect transparent or non-opaque print media, color media, pre-punched media (e.g., three-ring punched paper). Optical sensors may also be configured to identify pre-printed or other types of marked print media, for example, by contrast comparison of portions of the print media (e.g., infrared marked paper). Whether manual and/or automatic in operation, print media type detectable mechanism 55b is detectable, for example, by controller 30 or similar processing resources within print media supply unit 52. In this manner, controller 30, for example, is able to detect or otherwise determine print media type data 80d for print media supply tray 54a.

A print media present detectable mechanism 55c is configured to detect the presence and/or availability of print media 51 within tray 54a. Here, for example, print media present detectable mechanism 55c may be mechanically or electrically responsive in some way to the presence of print media 51. Print media present detectable mechanism 55c is detectable, for example, by controller 30 or similar processing resources within print media supply unit 52. In this manner, controller 30, for example, is able to detect or otherwise determine print media availability data 80d for print media supply tray 54a.

As shown, print media supply tray 54a is further associated with a tray position detectable mechanism 55d. Tray position detectable mechanism 55d is configured to be mechanically and/or electrically responsive to the movement and/or position of tray 54a. Thus, for example, if tray 54a is a drawer-operated type of tray, then tray position detectable mechanism 55d may detect when tray 54a is open and/or closed by the user. If, on the other hand,

alternatively) be set by the user via user interface 44. Here, for example, a print media size detectable mechanism 49a and a print media type detectable mechanism 49b may be provided through input keys 48 and/or printer display 46.

5 Similarly, in certain further implementations of the present invention, the size and type configuration of print media tray 54a are also (or alternatively) settable by the user via computer 22. Here, for example, print driver software 23d and/or graphical user interface 23e can be configured to accept user inputs, as necessary to remotely perform the functions of print
10 media size detectable mechanism 49a and print media type detectable mechanism 49b. The resulting configuration information can then be provided to printer 26 via communications network 24.

Thus, there are a variety of ways to establish the configuration, or to reconfigure printer 26. Those skilled in the art will recognize that other similar
15 arrangements can be employed to provide at least the same amount of detailed information to the user.

As described in the further exemplary methods as described below, printer configuration status data 80 is gathered, processed and portions of it displayed to user at critical times and in specific locations when, in the past, a
20 typical user may not have been made aware or had knowledge of the current configuration of printer 26. In the above example, the user is made aware of the current configuration whenever print media supply tray 54a is physically changed in some detectable manner. This information about the tray, the media size and type settings are displayed either on the tray and/or through printer
25 display 46. Thus, any user causing the detectable change will know what print media is to be loaded or reloaded into tray 54a, or if the tray needs to be reconfigured to support a particular print job.

In step 104, the current configuration status information about print media supply tray 54, including the print media size and the print media type, is determined using one or more detectable mechanisms. Current printer configuration status data 79 is generated in step 104 and provided as necessary to resources within printer 26 and/or computer 22.

Additionally, in step 102, a determination can be made within printer 26 and/or computer 22 to process a print job or print request, respectively. If a print request or print job cannot be met by the current printer configuration, then the appropriate user can be alerted per step 108, wherein at least portions of current printer configuration status data 79 is displayed to the user at either tray 54, printer 26, and/or computer 22. If the print request and/or print job can be met by the current printer configuration then the corresponding print job is completed as shown in step 110. If the print job fails to be completed, within step 110, the initiating user is alerted, as needed.

Here, a print job includes data to be printed and identifies at least one desired print media requirement within print media data 76. By way of further example, the print media requirement may include a print media type selection, a print media size selection, a print media marking selection, a simplex print selection, a duplex print selection, a print media post-processing selection, a print media availability selection, a print media supply tray selection, and/or a print media output tray selection.

In step 106, physical changes with respect to print media tray(s) 54 are detected using one or more detectable mechanisms. Thus, for example, if the user opens tray 54a or perhaps changes print media 51 in some detectable manner, then process 100 continues with step 108, wherein at least portions of current printer configuration status data 79 is displayed to the user at either tray 54 and/or printer 22.

Although some preferred implementations of the various methods and arrangements of the present invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the exemplary
5 implementations disclosed, but is capable of numerous rearrangements, modifications and substitutions without departing from the spirit of the invention as set forth and defined by the following claims.

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